

943,393.

F. H. DANIELS.
METHOD OF ANNEALING FLATS.
APPLICATION FILED DEC. 8, 1908.

Patented Dec. 14, 1909.
2 SHEETS—SHEET 1.

Fig. 1.

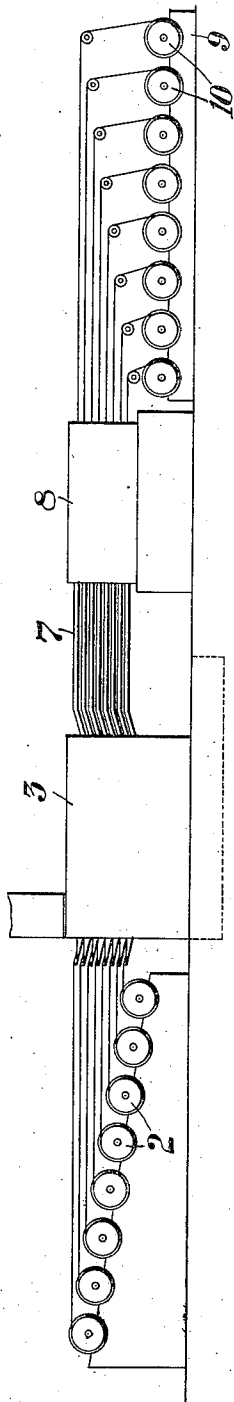
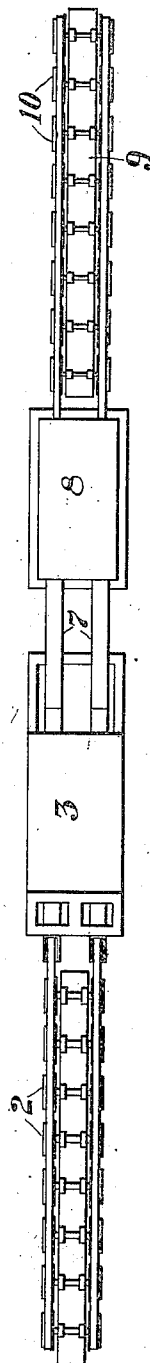


Fig. 2.



WITNESSES

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2 SHEETS—SHEET 2.

Fig. 3.

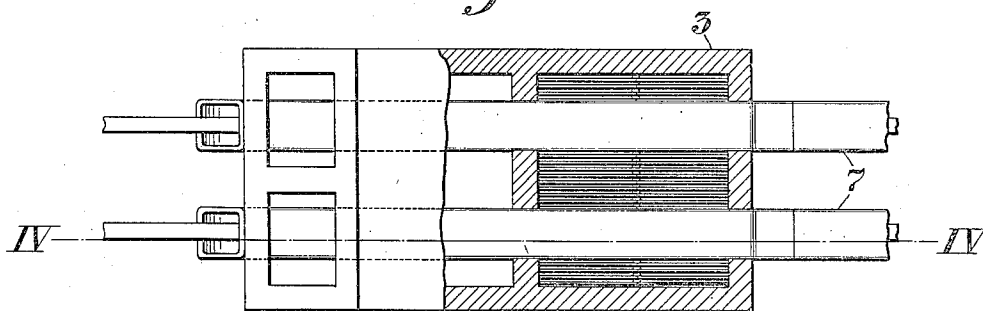


Fig. 4.

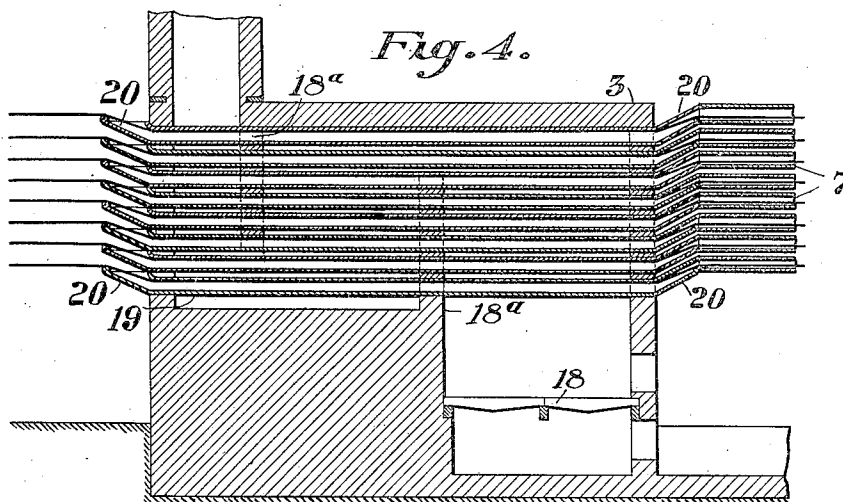
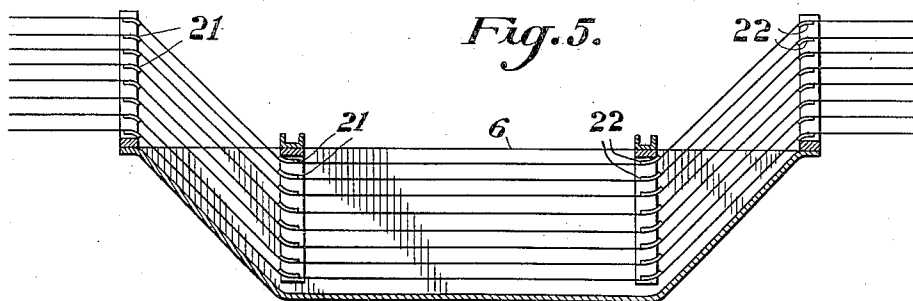


Fig. 5.



WITNESSES

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UNITED STATES PATENT OFFICE.

FRED H. DANIELS, OF WORCESTER, MASSACHUSETTS.

METHOD OF ANNEALING FLATS.

943,393.

Specification of Letters Patent. Patented Dec. 14, 1909.

Application filed December 8, 1908. Serial No. 466,472.

To all whom it may concern:

Be it known that I, FRED H. DANIELS, of Worcester, in the county of Worcester and State of Massachusetts, have invented a new and useful Improvement in Methods of Annealing Flats, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, forming part of this specification, in which—

Figure 1 is a side view showing diagrammatically one form of apparatus embodying my invention; Fig. 2 is a plan view of the same; Fig. 3 is a horizontal section of one form of furnace; Fig. 4 is a vertical section of the same; Fig. 5 is a longitudinal sectional view showing another form of annealing apparatus.

My invention has relation to improvements in annealing flats and other metal shapes and is especially applicable to shapes of long length and of various widths, and is designed to provide a continuous process, together with apparatus for carrying out the same, which will insure a uniform grade of material both physically and chemically. For round wire or narrow flats, common muffle or pot-annealing is more or less satisfactory in its results, as the heat penetrates comparatively quickly through the coils. The wider, however, the section is, the longer it will take for the heat to penetrate the closely wound bundles, and when it cools off, the outer portions will cool much more quickly than the inner portions; all these conditions prevent obtaining uniform grade of the product.

My invention is designed to provide a method by which the flats or other sections may be subjected to a uniform heating and cooling action throughout, thereby insuring a uniform texture and hardness.

In accordance with my invention, the flats when rolled in a rolling mill are reeled up into close bundles. These bundles are afterward placed on an unreeling apparatus, such as indicated at 2 in Figs. 1 and 2, and the unreeling flats are led therefrom through an annealing furnace, such as shown at 3 in Figs. 1, 2, 3 and 4, or at 6 in Fig. 5. After passing out of the annealing furnace, the flats are gradually cooled without coming into contact with the outer air. For this purpose, they are first passed through protecting pipes or tubes 7, and then through a receptacle 8, containing layers of coke, coal or charcoal, which prevents oxidation by

excluding air. The hot metal passing through this carbonaceous material, forms a non-oxidizing gas which protects the metal. The flats are then wound up on a suitable take-up frame 9, having reeling or coiling drums 10, upon which they are wound.

In the particular arrangement of apparatus shown in the drawings, provision is made for simultaneously annealing sixteen different flats, there being two sets of the unreeling rollers 2, arranged side by side, and each set containing eight rollers in successively lower planes, as shown in Fig. 1. The take-up frame 9 is provided with a similar number of the coiling or take-up rollers 10.

The annealing furnace 3, shown in Figs. 1, 2, 3 and 4, consists of a furnace having a grate 18 and baffle walls 18^a, with a plurality of open end receptacles 19, extending longitudinally through the heating chamber one above the other and in two series. The ends of these receptacles are turned upwardly, as shown at 20, above the level of the lead bath contained therein, it being understood that there is one of these receptacles for each of the flats being annealed. In the modification shown in Fig. 5, the flats are passed downwardly through suitable guides 21, into a lead-containing receptacle, thence through the same and upwardly, and out through the guides 22. The receptacle is heated by being placed over any suitable furnace.

The furnace shown and described is heated by coal or coke, but an equal result could be obtained by a furnace heated with gas, oil or any other manner known to the arts.

The advantages of my invention result from the uniform heating and cooling of the flats, whereby uniformity in the texture and hardness of the steel is obtained. Also from the simplicity of the apparatus which enables the process to be carried out continuously and with rapidity, it being possible to anneal a large number of flats or other sections simultaneously, thereby making possible a low manufacturing cost.

It will be understood that any desired number of flats or other sections can be simultaneously annealed.

I claim:

1. The method of treating flats and the like, which consists in drawing the flat through a lead annealing bath, and then into

and through a cooling chamber in which the flat is gradually cooled in a nonoxidizing atmosphere, the flat being drawn continuously through said bath and through the cooling chamber, and being protected from oxidizing influences while passing through the bath to and through the cooling chamber; substantially as described.

2. The method of treating flats and the like which consists in simultaneously drawing a plurality of flats through a lead annealing bath, thence into and through a cooling chamber in which the flats are gradually cooled in a non-oxidizing atmosphere, the flats being drawn continuously through said bath into and through the cooling chamber, and being protected from oxidizing influences while passing from the bath to and through the cooling chamber; substantially as described.

3. The method of annealing flats and the like, which consists in simultaneously drawing a plurality of flats through a lead annealing bath out of contact with each other, and thence through a cooling chamber, protecting the flats while cooling from oxidizing influences, and then passing the flats to a set of reeling devices arranged to draw and to reform the flats into bundles thereon; substantially as described.

4. The method of treating flats and the like, which consists in drawing a plurality of flats through a lead annealing bath out of contact with each other and then into and through a cooling chamber in which the flats are gradually cooled in a non-oxidizing atmosphere out of contact with each other, the flats being drawn continuously through

said bath and through the cooling chamber, and being protected from oxidizing influences while passing from the bath to and through the cooling chamber; substantially as described.

5. The method of treating flats and the like, which consists in drawing the flat through a lead annealing bath and then into and through a cooling chamber containing a mass of carbonaceous material in which the flat is cooled in a non-oxidizing atmosphere, the flat being drawn continuously through said bath and through said cooling chamber, and being protected from oxidizing influences while passing from the bath to and through the cooling chamber, substantially as described.

6. The method of annealing flats and the like, which consists in simultaneously drawing the flats from the bundles or coils through a lead annealing bath out of contact with each other, and thence through a cooling chamber containing a mass of carbonaceous material in which the flats are gradually cooled in a non-oxidizing atmosphere, the flats being drawn continuously through said bath and through the cooling chamber, and being protected from oxidizing influences while passing through the bath to and through the cooling chamber; substantially as described.

In testimony whereof, I have hereunto set my hand.

FRED H. DANIELS.

Witnesses:

GEORGE SILURIN,
A. F. BACKLIN.